March 11, 2002

Walter L. Jones
Pine Chemicals Association, Inc.
1117 Perimeter Center West
Atlanta, GA 30338

Dear Mr. Jones:

The Office of Pollution Prevention and Toxics is transmitting EPA's comments on the robust summaries and test plan for Rosin and Rosin Salts, posted on the ChemRTK HPV Challenge Web Site on October 4, 2001. I commend the Pine Chemicals Association for its commitment to the HPV Challenge Program.

EPA reviews test plans and robust summaries to determine whether the reported data and test plans will provide the data necessary to adequately characterize each SIDS endpoint. On its ChemRTK Web site EPA has provided guidance for determining the adequacy of data and preparing test plans used to prioritize chemicals for further work.

As with other submissions where the available data are either inadequate or insufficiently documented, this case will remain open until adequate documentation is in hand.

EPA will post this letter and the attached Comments on the ChemRTK Web site within the next few days. As noted in the comments, we ask that the Association advise the Agency, within 60 days of the posting, of any modifications to its submission.

If you have any questions about this response, please contact Richard Hefter, Chief of the HPV Chemicals Branch, at 202-564-7649. Submit general questions about the HPV Challenge Program through the ChemRTK Web site comment button or through the TSCA Assistance Information Service (TSCA Hotline) at (202) 554-1404. The TSCA Hotline can also be reached by e-mail at tsca-hotline@epa.gov.

I thank you for your submission and look forward to your continued participation in the HPV Challenge Program.

Sincerely,

/s/

Oscar Hernandez, Director
Risk Assessment Division

Attachment

cc: W. Sanders
A. Abramson
C. Auer
M. E. Weber

**EPA Comments on Chemical RTK HPV Challenge Submission: Rosins and Rosin Salts**

The sponsor, Pine Chemicals Association, Inc., submitted a test plan and robust summaries to EPA for the Rosins and Rosin Salts category dated July 2001. EPA posted the submission on the ChemRTK HPV Challenge Web site on 4 October 2001. The category includes rosin (CAS No. 8050-09-7), hydrogenated rosin (CAS No. 65997-06-0), rosin potassium salt (CAS No. 61790-50-9), rosin sodium salt (CAS No. 61790-51-0), rosin distillation overheads (CAS No. 68425-08-1), and rosin low boiling fraction (CAS No. 68783-82-4).

**SUMMARY OF EPA COMMENTS**

EPA has reviewed this submission and has reached the following conclusions:

1. Category Justification. The submitter adequately supports the grouping of rosin, hydrogenated rosin, and rosin potassium and sodium salts into this category and the testing of rosin as representative of these members. However, the submission provides insufficient information on the anticipated differences or similarities in rosin distillation overheads and rosin low boiling fraction compared to the other members. The submitter needs to discuss how rosin adequately represents these two members.

2. Physicochemical and Environmental Fate Data. (a) EPA concurs that these substances are not amenable to some physicochemical and environmental fate testing. However, EPA recommends that the submitter provide existing data on the principal individual components. (b) For biodegradation testing, the submitter needs to use the appropriate guideline (See Test Plan comments below).

3. Health Endpoints. (a) EPA agrees with the submitter's plan to test rosin for developmental toxicity to fulfill this endpoint and to provide additional supporting information on the potential for reproductive effects. (b) In addition, the submitter needs to provide genetic toxicity data to address this endpoint because the negative cancer studies will not be sufficient to characterize the risk for other genetic diseases.

4. Ecotoxicity. (a) The submitter's plan to test rosin as representative of rosin, hydrogenated rosin, rosin potassium salt, and rosin sodium salt is acceptable. The submitter needs to explain better why no other category member needs to be tested. (b)The submitter also needs to consider conducting a daphnid chronic study in addition to the proposed aquatic acute studies on appropriate chemicals to determine the acute and chronic aquatic toxicity cutoff limits. (c) Certain available data may help in refining the test plan (See Test Plan comments below).

EPA requests that the Submitter advise the Agency within 60 days of any modifications to its submission.

**EPA COMMENTS ON THE ROSINS AND ROSIN SALTS CATEGORY CHALLENGE SUBMISSION**

**Category Definition**

The rosin and rosin salts category covers rosin and five substances derived from rosin by hydrogenation, treatment with sodium or potassium hydroxide to form the acid salts, or distillation. Rosin is a chemically complex material that predominantly contains resin acids, a class of tricyclic carboxylic acids. The category, while its members are complex, appears adequately defined.

**Category Justification**

The test plan states that the three types of rosin (gum rosin, wood rosin and tall oil rosin) are chemically very similar but differ in the ratios of components. No typical compositional ranges, however, were provided in the test plan for the three different rosin types. The submitter referenced a March 13, 1992 letter from EPA acknowledging the similarity of the rosins by allowing one CAS number to describe all three types of rosins. The sodium and potassium salts of rosin are structurally identical to the components in rosin except for the salt counterions. Hydrogenated rosin retains the basic structure of the molecules in rosin. Thus, rosin, the salts of rosin, and hydrogenated rosin are structurally similar or virtually identical to each other.

However, "rosin, distillation overheads" and "rosin, low boiling fraction" have substantially different compositions from the others. While the typical composition of "rosin, low boiling fraction" was not provided, the submitter states that this substance is virtually identical to "rosin, distillation overheads". Most important, rosin acids may constitute only a minor percentage of the total mixture. While the test plan notes that the compositional differences are due in part to the thermal degradation of the source materials, it does not describe how these two category members are made nor how their compositions compare. Rather, the submitter provided the CAS number definitions. CAS number definitions, however, are typically vague when referring to complex mixtures, especially those derived from natural sources.

The submitter supports the grouping of the category members and the choice of rosin as the representative member of the category for testing mainly on the basis of structural similarity of the components. The submitter also supports the category on the basis of rosin as the common source of the category members. As noted above, four of the six members of the category, rosin, hydrogenated rosin, and the potassium and sodium salts of rosin, are structurally similar or virtually identical to rosin. The rosin salts will have different physicochemical properties than rosin, but should have similar environmental properties, aquatic toxicity, and health effect toxicities. This is principally because the extent to which they remain salts or revert to the parent acid in the environment or gut will be dictated by their $pK_a$ values and buffering capacity of the environment rather than their initial state.

Hydrogenated rosins differ from rosin in having fewer conjugated double bonds. This change will also be reflected in the physicochemical properties of hydrogenated rosin, but will likely have a minor impact on their environmental and toxicological properties, given the structural similarities of the products.

The two remaining members of the category, "rosin, distillation overheads" and "rosin, low boiling fraction," while compositionally similar to each other, are substantially different from the other four members. The dominant distinguishing feature of these two members is the lower percentage of rosin acids and higher percentage of fatty acids, hydrocarbons, and rosin aldehydes, alcohols, and esters compared to the other members. No information is presented in the test plan that describes how these compositional differences will affect the toxicological or environmental properties of these category members. Without this type of assessment, it is not possible to determine if rosin adequately represents these two members. Therefore, the submitter needs to provide more detail on why the anticipated toxicological (aquatic and mammalian) and environmental properties of "rosin, distillation overheads" and "rosin, low boiling fraction" will not differ significantly from rosin or, if significant differences are anticipated, what those differences might be.

**Test Plan**

Chemistry (melting point, boiling point, vapor pressure, water solubility, and partition coefficient).

The submitter's approach to these endpoints (according to Table 1 in the Test Plan) is acceptable for the purposes of the HPV Challenge Program. EPA concurs that these substances are not amenable to some

physicochemical and environmental fate testing. However, EPA recommends that the submitter also provide existing physicochemical and environmental fate data on the principal rosin and rosin salt components: abietic acid, dehydroabietic acid, isopimaric acid, and their corresponding salts.

Environmental Fate (Photodegradation, Stability in Water, Biodegradation, Fugacity).

The submitter's approach to these endpoints (according to Table 1 in the Test Plan) is acceptable for the purposes of the HPV Challenge Program; however, EPA has some comments on biodegradation.

*Biodegradation*. The submitter did not provide a biodegradation robust summary for hydrogenated rosin even though Table 1 of the Test Plan indicates adequate existing data for this endpoint. The submitter needs to resolve the discrepancy.

Under the biodegradation test for tall oil rosin the submitter indicates that the biological oxygen demand was 32 % after 28 days. On the other hand, the rosin sodium salt was around 70 - 80% degraded after 21 days. Such a difference seems unlikely. The method used for testing the rosin salt was apparently the shake flask method similar to OECD Test Method 307, which specifies far more vigorous conditions for biodegradation than does a ready biodegradation test. The submitter should confirm they are reporting the correct OECD test method in the case of the sodium salt. In any case, the existing adequate test for tall oil rosin should satisfy this endpoint for the salts. The submitter should use OECD Guideline 301 - Ready Biodegradability test - for any remaining biodegradation testing.

Health Effects (acute toxicity, repeat dose toxicity, genetic toxicity, and reproductive/developmental toxicity).

The submitter provided data in the robust summaries on rosin and hydrogenated rosin, and proposes developmental toxicity testing of rosin.

*Acute Toxicity*. Although summaries of the acute oral toxicity study have limitations, considering the high doses tested (above 4 g/kg), and the data from repeat dose toxicity studies, this endpoint is adequately addressed.

*Repeated Dose Toxicity*. Adequate data were provided in the robust summaries for repeat dose toxicity of rosin and hydrogenated rosin.

*Genetic Toxicity*. The submitter did not provide test data in the robust summaries for genetic toxicity (gene mutation or chromosome aberration), but considered the endpoint fulfilled by four 2-year feeding studies of carcinogenicity. The test plan proposed that the genetic toxicity endpoint is intended to illuminate carcinogenicity potential, so that existing negative carcinogenicity data eliminate the need for genetic toxicity information. However, the genetic toxicity endpoint is separate from carcinogenicity and can not be satisfied by carcinogenicity data alone, because mutations are implicated in several disease states in addition to cancer. Examples include Down's and Klinefelter syndromes, cystic fibrosis, hemophilia, sickle-cell anemia, achondroplastic dwarfism, hypercholesterolemia, hypertension, pyloric stenosis, glaucoma, allergies, cancer, and mental retardation (Mutagenicity Risk Assessment Guidelines, EPA 1986). EPA believes that the genotoxicity endpoint is not adequately addressed in the discussion of the test plan and testing is needed to satisfy this endpoint.

Table 1 of the test plan should be corrected to show gene mutation and chromosomal aberration, rather than bacterial and non-bacterial assays, as the two endpoints for genotoxicity.

*Reproductive Toxicity/Developmental Toxicity*. The submitter proposed testing rosin to address developmental toxicity. EPA agrees that this testing, together with the information for reproductive organ gross and histologic pathology in the existing 90-day repeated-dose toxicity studies, will adequately address the reproductive/developmental toxicity endpoints.

Ecotoxicity (fish, invertebrate and algal toxicity) No aquatic toxicity robust summaries were submitted because the submitter considered existing data inadequate owing to inconsistencies in sample preparation.

Two fish acute 96-hour toxicity studies on abietic (CAS# 514103) and dehydroabietic (CAS#1740198) acids conducted at the EPA Laboratory in Duluth, MN, are available in the open literature (Acute Toxicities of Organic Chemicals to Fathead Minnows (*Pimephales Promelas*) Volume II, Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Geiger, D.L. et al.1985, pp 317-320). Abietic and dehydroabietic acids showed toxicity to fathead minnow at 2.38 and 2.10 mg/L, respectively. EPA suggests that the submitter review these studies for Test Plan purposes, particularly if the "other" components (12% in the submitter's example) will not influence the overall toxicity of the test substance.

The submitter proposes to conduct acute fish, invertebrate, and algal toxicity testing on rosin under conditions that will maximize solubility and reduce exposure to insoluble fractions. No information, however, was provided that explained how these conditions will be achieved (normally these include neutralization to pH 7 or use of the sodium salt). Furthermore, no information was provided to explain why the test results of rosin will adequately describe the aquatic toxicity of "rosin, distillation overheads" and "rosin, low boiling fraction." Finally, aquatic toxicity studies of chemicals having low water solubility require testing at or below the water solubility limit and may be difficult to test. Guidance for testing chemicals of this type is provided in the Guidance Document on Aquatic Toxicity Testing of Difficult Substances and Mixtures (OECD, June 2000 available at http://www.oecd.org/ehs/test/monos.htm).

The submitter needs to consider daphnid chronic reproductive toxicity testing owing to the hydrophobic nature of these compounds. EPA has indicated (65 FR 61695) (http://www.epa.gov/EPA-TOX/2000/December/Day-26/t32498.htm) that chronic daphnid reproductive testing may be needed when the log Kow exceeds or equals 4.2 for some of these chemicals. The results of proposed testing for water solubility and partition coefficient as well as the acute aquatic toxicity tests will determine the need for the test. Therefore, the submitter needs to provide additional information about the anticipated toxicity of these category members and proposed test methods.

**Specific Comments on the Robust Summaries**

Health Effects

*Acute Toxicity*. In the summary for rosin, dose levels tested were not clearly delineated.

**Followup Activity**

EPA requests that the Submitter advise the Agency within 60 days of any modifications to its submission.